UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 10/716,286 | 11/18/2003 | Sriram Devanathan | 592-L | 6071 |

34225 7590 11/27/2007

UNISYS CORP.
25725 JERONIMO ROAD, MS400
MISSION VIEJO, CA 92691

| EXAMINER | |
|---|---|
| SYED, FARHAN M | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2165 | |

| MAIL DATE | DELIVERY MODE |
|---|---|
| 11/27/2007 | PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov



**BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

Application Number: 10/716,286
Filing Date: November 18, 2003
Appellant(s): DEVANATHAN ET AL.

Phuong-Quan Hoang
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 21 August 2007 appealing from the Office action mailed 11 January 2007.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is substantially correct. The changes are as follows:

Claims 15 and 27 stand rejected under 35 U.S.C. 101 as being unpatentable for being directed to non-statutory subject matter.

The Examiner withdraws the rejection of claims 1, 13, 15, and 27 under 35 U.S.C. 102(e), as being anticipated by U.S. Patent Application Publication 2004/0133581 A1 of Shinjo (hereinafter, "Shinjo").

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

Teorey T., et al "A Logical Design Methodology for Relational Database Using the Extended Entity-Relationshup Model", ACM Computing Survey (CSUR), June 1986, vol. 18, issue 2, pp. 197-222.

Farpinyo, K., et al, "Designing and Creating Relational Schemas with a CWM-Based Tool," Department of Computer Engineering - Chulalongkorn University, 2002, pp. 456-461

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

***Claim Rejections - 35 USC § 101***

1. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 15 and 21 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

As per claim 15, the claim clearly recite a "An article of manufacture comprising of: a machine-accessible storage medium including data that, when accessed by a machine, causes the machine to perform the operation of:" The Applicant uses the word "machine-accessible medium" on page 10 of the specification, which recites "the program or code segments can be stored in a process or a machine accessible medium or transmitted by a computer data signal embodied in a carrier wave, or a signal modulated by a carrier, over a transmission medium. Examples of the processor readable or machine accessible medium include an electronic circuit, a semiconductor memory device, a read only memory (ROM), a flash memory, an erasable ROM (EROM), a floppy diskette, a compact disk (CD) ROM, an optical disk, a hard disk, a fiber optic medium, a radio frequency (RF) link, etc. The computer data signal may include any signal that can propagate over a transmission medium such as electronic network channels, optical fiber, air, electromagnetic, RF links, etc." Based on these

references, the Examiner understands that implementing the claim mentioned above would render the result of the claim as intangible. A signal-bearing medium is not tangible, and cannot tangibly embody a computer program or process since a computer cannot understand/realize (i.e. execute) the computer program or process when embodied on the data signal. Computer program or processes are only realized within the computer when stored in a memory or storage element (such as RAM or ROM). Therefore, a data signal does not meet the "useful, concrete, and tangible" requirement as set forth in *State Street*, 149 F.3d at 1373, 47 USPQ2d at 1601-02, and hence claims 25-32 are non statutory under 35 U.S.C. 101.

As per claim 27, the claim clearly recite a "A memory coupled to the processor, the memory containing program code that, when executed by the processor, causes the processor to perform the operation:" The Applicant uses the word "program code" on page 10 of the specification, which recites "the program or code segments can be stored in a process or a machine accessible medium or transmitted by a computer data signal embodied in a carrier wave, or a signal modulated by a carrier, over a transmission medium. Examples of the processor readable or machine accessible medium include an electronic circuit, a semiconductor memory device, a read only memory (ROM), a flash memory, an erasable ROM (EROM), a floppy diskette, a compact disk (CD) ROM, an optical disk, a hard disk, a fiber optic medium, a radio frequency (RF) link, etc. The computer data signal may include any signal that can propagate over a transmission medium such as electronic network channels, optical

fiber, air, electromagnetic, RF links, etc." Based on these references, the Examiner understands that implementing the claim mentioned above would render the result of the claim as intangible. A signal-bearing medium is not tangible, and cannot tangibly embody a computer program or process since a computer cannot understand/realize (i.e. execute) the computer program or process when embodied on the data signal. Computer program or processes are only realized within the computer when stored in a memory or storage element (such as RAM or ROM). Therefore, a data signal does not meet the "useful, concrete, and tangible" requirement as set forth in *State Street*, 149 F.3d at 1373, 47 USPQ2d at 1601-02, and hence claims 25-32 are non statutory under 35 U.S.C. 101.

***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 13, 15, and 27 are rejected under 35 U.S.C. 102(b) as being anticipated by a non-patent literature titled "A Logical Design Methodology for Relational Database Using the Extended Entity-Relationship Model" by Toby J. Teorey, Dongqing Yang, and James P. Fry, ACM Computing Survey (CSUR), June 1986, vol. 18, issue 2 (and known hereinafter as Teorey).

As per claims 1, 13, 15, and 27, Teorey teaches a method comprising: converting logical aspects of a common warehouse model (CWM) to corresponding design items for a relational database by processing in a hierarchical manner the logical aspects and creating the corresponding design items, the logical aspects comprising entity-relationship (ER) libraries, the ER libraries comprising ER models, the corresponding design items comprising design libraries, the design libraries comprising design models (i.e. *"A database design methodology is defined for the design of large relational databases. First, the data requirements are conceptualized using an extended entity-relationship model, with the extensions being additional semantics such as ternary relationships, optional relationships, and the generalization abstraction. The extended entity-relationship model is then decomposed according to a set of basic entity-relationship constructs, and these are transformed into candidate relations."*)(Abstract).

4. Claims 1, 13, 15, and 27 are rejected under 35 U.S.C. 102(b) as being anticipated by a non-patent literature titled "Designing and Creating Relational Schemas with a CWM-Based Tool" by Kumpon Farpinyo and Twittie Senivongse, pages 456-461, 2002 (known hereinafter as Farpinyo).

As per claims 1, 13, 15, and 27, Farpinyo teaches a method comprising: converting logical aspects of a common warehouse model (CWM) to corresponding design items for a relational database by processing in a hierarchical manner the logical aspects and creating the corresponding design items, the logical aspects comprising entity-relationship (ER) libraries, the ER libraries comprising ER models, the

corresponding design items comprising design libraries, the design libraries comprising design models (i.e. *"This paper presents a design and development of a tool called ER2CWM that creates CWM relational database schemas from physical data models represented by ER diagrams. The tool supports the creation of ER diagrams, transformation into CWM format, and creation of database schemas for relational database management systems. It can also transform database schemas back into CWM and ER diagrams respectively." "ER diagrams are generally used to express designs of relational databases [1]. There are tools, such as PowerDesigner [2] and Erwim [3], that can help database designers to design a database with ER diagrams and create database schemas. These tools usually support the reverse of the process to create ER diagrams from existing database schemas also. All these are done via intermediate schema representations that are specific to individual design tools. This means, for example, PowerDesigner and Erwim both have their own metadata format that represents ER models and is used to create database schemas. This situation is not convenient for the designers to export a database schema designed and created by one tool to other working environments since specific mappng between the metadata of the source environment and the one understood by the target will be required for each pair of the exchanging environment."*)(Abstract; page 456, paragraph 1).

5. Claims 1, 13, 15, and 27 are rejected under 35 U.S.C. 102(e) as being anticipated by Shinjo (U.S. Patent Pub. 2004/0133581 A1).

As per claims 1, 13, 15, and 27, Shinjo teaches a method comprising: converting logical aspects of a common warehouse model (CWM) to corresponding design items for a relational database by processing in a hierarchical manner the logical aspects and creating the corresponding design items, the logical aspects comprising entity-relationship (ER) libraries, the ER libraries comprising ER models, the corresponding

design items comprising design libraries, the design libraries comprising design models (i.e. *"When a relational database is generated, conceptual design, logical design, and physical design are required. In each designing process, a model of a set of data structure describing a data format, data relation, integrity constraint, etc. is generated as a schema. In the conceptual design, a concept model is generated by describing a part of a target real world in predetermined notation. In the logical design, a logical model is generated using a table, an index, and a data structure viewed from the user interface 110 (referred to as a "view") as a logical data structure of a practical database model. In the physical design, the representation format of the storage device of a hard disk, etc., a file organization, an access method, contents of data, etc. are determined. In the conceptual design, an entity relationship model (E-R model) is frequently used in representing a model of a target real world. In the entity relationship model, there are two concepts, that is, an "entity" and a "relation". An entity refers to an inclusive description of an object to be recognized when a database designer designs a model of a target real world. Various characteristics of an entity are represented by "attributes". A relation refers to a model of the correlation between two or more entities."* The preceding text clearly indicates that an E-R model is frequently used to convert data from a source into a relational database. It is well known in the art that when creating a logical or conceptual design that there exists models and libraries within the ER-Model which corresponds to the models and libraries of a relational database. Although the primary reference does not refer to CWM, it is an intended use to convert CWM information into a relational database through an ER Model.)(page 1, paragraphs [009]-[0010]).

## ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 2-12, 14, 16-26, 28-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over a non-patent literature titled "A Logical Design Methodology for Relational Database Using the Extended Entity-Relationship Model" by Toby J. Teorey, Dongqing Yang, and James P. Fry, ACM Computing Survey (CSUR), June 1986, vol. 18, issue 2 (and known hereinafter as Teorey) in view of a non-patent literature titled "Designing and Creating Relational Schemas with a CWM-Based Tool" by Kumpon Farpinyo and Twittie Senivongse, pages 456-461, 2002 (known hereinafter as Farpinyo).

As per claims 2, Teorey does not explicitly teaches a method wherein converting comprises the operations of: (a) scanning through the ER libraries; (b) for a first of the ER libraries, creating a corresponding first design library; (c) for each of the ER models in the first ER library, creating a corresponding design model in the corresponding first design library to hold corresponding information; (d) processing each of the ER models to produce corresponding information for the corresponding design model; (e) determining if there are any references between the ER models; and (f) if there are any references between the ER models, specifying corresponding references in corresponding design models.

Farpinyo teaches a method wherein converting comprises the operations of: (a) scanning through the ER libraries (i.e. *"DBMS Information – This modue, via JDBC, creates*

*database schema from CWM Relational metadata, reads in existing database schemas to create CWM Relational metadata and ER diagrams, and maintains information about DBMSes that ER2CWM supports, i.e. SQL data types and database commands for creating and reading in schemas. DBMSes on which ER2CWM have been tested are Sybase Adaptive Server v.11.9.2 [9] and Microsoft SQL Server 2000 [10]. Other DBMSes can be supported by providing ER2CWM with .jar files that contain corresponding DBMS information."* The preceding text clearly indicates that ER2CWM supports SQL data types and database commands for creating and reading schemas. It is clear that in order to create and read schemas, scanning of ER libraries must be performed. Figure 3 clearly illustrates such example.)(Page 459, paragraph 3); (b) for a first of the ER libraries, creating a corresponding first design library; (c) for each of the ER models in the first ER library, creating a corresponding design model in the corresponding first design library to hold corresponding information; (d) processing each of the ER models to produce corresponding information for the corresponding design model; (e) determining if there are any references between the ER models; and (f) if there are any references between the ER models, specifying corresponding references in corresponding design models (For the remainder of steps b-f are steps found in the user manual of the ER2CWM tool.)(Page 461, paragraph 1).

It would have been obvious to a person of ordinary skill in the art at the time of Applicant's invention to modify the teachings of Teorey with the teachings of Farpinyo to include a method wherein converting comprises the operations of: (a) scanning through the ER libraries; (b) for a first of the ER libraries, creating a corresponding first design library; (c) for each of the ER models in the first ER library, creating a corresponding design model in the corresponding first design library to hold corresponding information; (d) processing each of the ER models to produce corresponding information for the

corresponding design model; (e) determining if there are any references between the ER models; and (f) if there are any references between the ER models, specifying corresponding references in corresponding design models with the motivation to facilitate database design, creation, and maintenance via a standard CWM format that can also be ported for use in other environments. (Farpinyo, Abstract).

As per claims 3, Teorey does not explicitly teach a method wherein, in operation (d), each of the ER models is processed independently.

Farpinyo teaches a method wherein, in operation (d), each of the ER models is processed independently (Figures 1-11 steps through the process of creating an ER model and then converting it into a relational database. This process is a continuous process, where each ER model is created independently from the other, until the user completes the desired relational database specifications.)(Figures 1-11).

It would have been obvious to a person of ordinary skill in the art at the time of Applicant's invention to modify the teachings of Teorey with the teachings of Farpinyo to include a method wherein, in operation (d), each of the ER models is processed independently with the motivation to facilitate database design, creation, and maintenance via a standard CWM format that can also be ported for use in other environments. (Farpinyo, Abstract).

As per claim 4, Teorey teaches the method of processing entity subtype relationships in the first ER model (i.e. *"Adopting an ER extension called the entity-category-relationship model, Navathe and others have organized the different classes of objects and relationships*

*into forms that are either compatible or incompatible for view integration. A category is defined as a subset of entities from an entity type, thus representing a form of generalization hierarchy."* The preceding text clearly indicates that subtype relationships are a subset of entities and the first ER model is an entity type.)(page 206, paragraph 5); and processing non-subtype relationships in the first ER model (i.e. *"The integration process is applied to four possible forms of object class similarity: identical domains, contained (subset) domains, overlapping domains, and disjointed domains."* The previous text clearly indicates that disjointed domains are a form of a non-subtype relationship within the ER model.)(page 206-207, paragraph 6).

Teorey does not explicitly teach a method wherein operation (d) comprises: processing ER subject areas included in a first of the ER models; processing ER domains included in the first ER model; processing domain inheritance for each of the ER domains; and processing ER entities included in the first ER model.

Farpinyo teaches a method wherein operation (d) comprises: processing ER subject areas included in a first of the ER models; processing ER domains included in the first ER model; processing domain inheritance for each of the ER domains; and processing ER entities included in the first ER model. (Figures 1-11 steps through the process of creating an ER model and then converting it into a relational database. This process is a continuous process, where each ER model is created independently from the other, until the user completes the desired relational database specifications.)(Figures 1-11).

It would have been obvious to a person of ordinary skill in the art at the time of Applicant's invention to modify the teachings of Teorey with the teachings of Farpinyo to include a method wherein operation (d) comprises: processing ER subject areas included in a first of the ER models; processing ER domains included in the first ER model; processing domain inheritance for each of the ER domains; and processing ER

entities included in the first ER model with the motivation to facilitate database design, creation, and maintenance via a standard CWM format that can also be ported for use in other environments. (Farpinyo, Abstract).

As per claims 5, Teorey teaches a method wherein processing ER subject areas comprises: for each of the ER subject areas included in the first ER model, creating a corresponding design subject area in the corresponding first design model (i.e. *"...third, it defines mappings between equivalent attributes of corresponding object classes."* The previous text clearly indicates that attributes are associated to an ER model and object classes are associated to a relational database, thus establishing correspondence between an ER model and a relational database design model.)(page 206, paragraph 6).

As per claims 6, Teorey teaches a method wherein processing domains comprises: for each of the ER domains included in the first ER model, creating a corresponding design domain in the corresponding first design model (i.e. *"The integration process is applied to four possible forms of object class similarity: identical domains, contained (subset) domains, overlapping domains, and disjoint domains."* The preceding text clearly indicates that creating is integration process.)(Page 206-207, paragraph 6); determining parameters for each of the ER domains, including base type, default and constraint (i.e. *"Relationships are classified in terms of their degree, the role of each object class in the relationship and various constraints, such as cardinality constraints that may differ among object classes."* The previous text clearly illustrates a type of parameter for each ER domain such as type and constraint, where type is the role of each object class and constraint is an instance of various constraints.)(Page 207, paragraph 1); and setting corresponding parameters for each of the corresponding design domains.

As per claims 7, Teorey teaches a method wherein processing domain inheritance comprises: determining, for a first of the ER domains, whether there is a first generalization in the CWM that links the first ER domain (i.e. *"A generalization hierarchy occurs when an entity (which we call the generic entity) in partitioned by different values of a common attribute (Figure 2b). For example, the entity EMPLOYEE is a generalization of ENGINEER, SECRETARY, and TECHNICIAN."* The preceding text clearly illustrates a link in the first ER domain, which could be an ENGINEER, SECRETARY, or TECHNICIAN.)(Page 201, paragraph 4); if there is the first generalization, determining parent ER domain and child ER domain for the first generalization, the parent and child ER domains corresponding to corresponding parent and child design domains (i.e. *"A generalization hierarchy occurs when an entity (which we call the generic entity) in partitioned by different values of a common attribute (Figure 2b). For example, the entity EMPLOYEE is a generalization of ENGINEER, SECRETARY, and TECHNICIAN."* The preceding text clearly indicates that the parent design domain may be the ENGINEER, SECRETARY, and TECHNICIAN and the child domain is an EMPLOYEE.)(Page 201, paragraph 4); and creating inheritance link from the corresponding child design domain to the corresponding parent design domain (Figure 5 illustrates the inheritance link between the student, club, and school, where belongs-to, located-in, and attends are links between the domains.)(Figure 5).

As per claims 8, Teorey teaches a method wherein processing ER entities comprises: for a first ER entity included in the first ER model, creating a corresponding first design entity in the corresponding first design model (i.e. *"On the basis of a categorization of extended ER constructs and a set of mapping rules, each relationship and its associated entities are transformed into a set of candidate relations."* The preceding text clearly illustrates that the first ER entity

in the first ER model is the ER construct, creating a corresponding design entity is the transformation of the relationship into a set of candidate relations using the set of mapping rules. That is, for each ER entity, the transformation creates a parallel design entity in the relational database.)(Page 199, paragraph 2); determining first ER subject areas associated with the first ER entity, the first ER subject areas corresponding to first design subject areas (i.e. *"On the basis of a categorization of extended ER constructs and a set of mapping rules, each relationship and its associated entities are transformed into a set of candidate relations."* With the set of mapping rules contains the subject area of which the first ER entity will correspond to the design entity of the relational database. An ordinary person skilled on the art would understand that each relationship and its associated entities would include the subject area of the ER entity, when creating the subject area of the design entity.)(Page 199, paragraph 2); adding the corresponding first design entity as a member of the corresponding first design subject areas (i.e. *"On the basis of a categorization of extended ER constructs and a set of mapping rules, each relationship and its associated entities are transformed into a set of candidate relations."* Based on the reasoning above the set of mapping rules contains the corresponding first design entity as a member of the corresponding first design subject area.)(Page 199, paragraph 2); and processing attributes associated with the first ER entity (i.e. *"On the basis of a categorization of extended ER constructs and a set of mapping rules, each relationship and its associated entities are transformed into a set of candidate relations."* The transformation of the relationship establishes that the processing of attributes associated with the first ER entity.)(Page 199, paragraph 2).

As per claims 9, Teorey teaches a method wherein processing attributes associated with the first ER entity comprises: creating a first design attribute to correspond to the first ER attribute (i.e. *"Attach attributes to entities that describe most directly. For example, attribute OFFICE-BUILDING should be an attribute of the entity DEPARTMENT instead of the entity EMPLOYEE." "Our example is drawn from a company personnel and project database EER*

*schema, illustrated in Figure 7 (Section 2.2), which indicates the transformation of all types of EER constructs to relations"* The preceding text clearly indicates that an ER attribute is created and then corresponds to a design attribute based on Figure 8.)(page 204, paragraph 8); attaching the design attribute to the first design entity (i.e. *"Attach attributes to entities that describe most directly. For example, attribute OFFICE-BUILDING should be an attribute of the entity DEPARTMENT instead of the entity EMPLOYEE." "On the basis of a categorization of extended ER constructs and a set of mapping rules, each relationship and its associated entities are transformed into a set of candidate relations."*)(page 204, paragraph 8; page 199, paragraph 2); setting type reference of the first design attribute (i.e. *"Attach attributes to entities that describe most directly. For example, attribute OFFICE-BUILDING should be an attribute of the entity DEPARTMENT instead of the entity EMPLOYEE." "On the basis of a categorization of extended ER constructs and a set of mapping rules, each relationship and its associated entities are transformed into a set of candidate relations."*)(page 204, paragraph 8; page 199, paragraph 2); determining whether the first ER attribute is part of a first ER primary key associated with the first ER entity (i.e. *"The many-to-many relationship, shown here as totally optional, requires a relationship relation with primary keys of both entities (Figure 8f). The same transformation applies to either the optional or mandatory case."*)(pages 208-210, paragraph 10); and if the first ER attribute is part of the first ER primary key, flagging the first design attribute as pad of a first design primary key associated with the first design entity.

As per claims 10, Teorey teaches a method wherein processing entity subtype relationships comprises: determining whether there is a first CWM generalization that links two of the ER entities in the first ER model (i.e. *"The transformation of disjoint subset generalization produces a separate relation for the whole set (the generic entity) and each of the subsets."*)(Page 210, paragraph 4); if there is the first CWM generalization, determining

parent and child ER entities for the first CWM generalization, the parent and child ER entities corresponding to corresponding parent and child design entities (i.e. *"A generalization hierarchy occurs when an entity (which we call the generic entity) in partitioned by different values of a common attribute (Figure 2b). For example, the entity EMPLOYEE is a generalization of ENGINEER, SECRETARY, and TECHNICIAN."* The preceding text clearly indicates that the parent design domain may be the ENGINEER, SECRETARY, and TECHNICIAN and the child domain is an EMPLOYEE.)(Page 201, paragraph 4); and creating inheritance link from the corresponding child design entity to the corresponding parent design entity (Figure 5 illustrates the inheritance link between the student, club, and school, where belongs-to, located-in, and attends are links between the domains.)(Figure 5).

As per claims 11, Teorey teaches a method wherein processing non-subtype relationships comprises: obtaining references to parent and child ER entities in a first ER relationship, the parent and child ER entities corresponding to parent and child design entities in the first design model (i.e. *"Entity relation with the embedded foreign key of the parent entity. This transformation always occurs with binary relationships that are one to many for the entity on the many (child) side and the one to one for the entities, and with a unary relationship that is one to one or one to many for each entity"*)(Page 208, paragraph 5); creating a corresponding design link between the corresponding parent and child design entities in the first design model (Figure 5 illustrates the design link between the student, club, and school, where belongs-to, located-in, and attends are links between the domains.)(Figure 5); setting cardinality and relationship type for the corresponding design link (i.e. *"The actual number associated with the term "many" is called the cardinality of the connectivity. Cardinality may be represented by upper and lower bounds. Figure 3 shows the basic constricts for connectivity: one to one (unary or binary relationship) one to many (unary*

*or binary relationship), and many to many (unary or binary relationship).")*(Page 201, paragraph 9); determining whether first ER relationship has at least one referential rule (i.e. *"We now look at each EER construct in more detail to see how each transformation rule is defined and applied."* The preceding text clearly indicates that at least one transformation rule is defined and applied, where the transformation rule is a referential rule.)(Page 208, paragraph 2); and if the first ER relationship has at least one referential rule, processing the at least one referential rule (i.e. *"On the basis of a categorization of extended ER constructs and a set of mapping rules, each relationship and its associated entities are transformed into a set of candidate relations."*)(Page 199, paragraph 2).

As per claims 12, Teorey teaches a method wherein processing the at least one referential rule comprises; obtaining parameters including "inset" "update" and "delete" from the CWM; setting corresponding parameters for the corresponding design link (Figure 5 illustrates the design link between the student, club, and school, where belongs-to, located-in, and attends are links between the domains.)(Figure 5); determining whether there is an ER attribute in the child ER entity that has migrated from the parent ER entity (i.e. *"Entity relation with the embedded foreign key of the parent entity. This transformation always occurs with binary relationships that are one to many for the entity on the many (child) side and the one to one for the entities, and with a unary relationship that is one to one or one to many for each entity"*)(Page 208, paragraph 5); and if there is such an ER attribute corresponding to a design attribute, then: creating a design foreign key under the child design entity (i.e. *"In both the mandatory case (Figure 9a) and the optional case (Figure 9b) the pairing entity key appears as a foreign key in the resulting relation"* The preceding text clearly indicates that the resulting relation is the design entity and the foreign key is the design foreign key.)(Page 210, paragraph 1); and creating references to the

corresponding design attribute (i.e. *"In both cases the two key attributes are taken from the same domain but are given different names to designate their unique use."*)(Page 210, paragraph 1).

Teorey does not teach a method wherein processing the at least one referential rule comprises; obtaining parameters including "inset" "update" and "delete" from the CWM.

Farpinyo teaches a method wherein processing the at least one referential rule comprises; obtaining parameters including "inset" "update" and "delete" from the CWM (i.e. *"ER Editor – This is the editor for designing physical data models with ER diagrams based on CODASYL [8]. It is also a GUI of ER2CWM; database designers can create CWM Relational metadata, select DBMSes to create database schemas, or create CWM Relational metadata and ER diagrams from existing relational databases."* The preceding text clearly illustrates that an ER editor would contain an insert, update and delete parameters, which when selecting these commands would be a referential rule.)(Page 459, paragraph 1).

It would have been obvious to a person of ordinary skill in the art at the time of Applicant's invention to modify the teachings of Teorey with the teachings of Farpinyo to include a method wherein processing the at least one referential rule comprises; obtaining parameters including "inset" "update" and "delete" from the CWM with the motivation to facilitate database design, creation, and maintenance via a standard CWM format that can also be ported for use in other environments. (Farpinyo, Abstract).

As per claim 14, Teorey does not explicitly teach a method wherein converting logical aspects comprises the operations of: (a) scanning through the ER libraries; (b) for a first of the ER libraries, creating a corresponding first design library; (c) for each of

the ER models in the first ER library, creating a corresponding design model in the corresponding first design library to hold corresponding information; (d) processing each of the ER models to produce corresponding information for the corresponding design model; (e) determining if there are any references between the ER models; and (f) if there are any references between the ER models, specifying corresponding references in corresponding design models; and wherein converting physical aspects comprises:(g) scanning through the relational catalogs; (h) for a first of the relational catalogs, creating a corresponding first DBMS catalog in the relational database; (i) for each of the relational schemas in the first relational catalog, creating a corresponding DBMS schema in the corresponding DBMS catalog to hold corresponding information; and (j) processing each of the relational schemas to produce corresponding information for the corresponding DBMS schema.

Farpinyo teaches a method wherein converting logical aspects comprises the operations of: (a) scanning through the ER libraries (i.e. *"DBMS Information – This modue, via JDBC, creates database schema from CWM Relational metadata, reads in existing database schemas to create CWM Relational metadata and ER diagrams, and maintains information about DBMSes that ER2CWM supports, i.e. SQL data types and database commands for creating and reading in schemas. DBMSes on which ER2CWM have been tested are Sybase Adaptive Server v.11.9.2 [9] and Microsoft SQL Server 2000 [10]. Other DBMSes can be supported by providing ER2CWM with .jar files that contain corresponding DBMS information."* The preceding text clearly indicates that ER2CWM supports SQL data types and database commands for creating and reading schemas. It is clear that in order to create and read schemas, scanning of ER libraries must be performed. Figure 3 clearly illustrates such example.)(Page 459, paragraph 3); (b) for a first of the ER libraries, creating a corresponding first design library; (c) for each of the ER models in the first ER library, creating a

corresponding design model in the corresponding first design library to hold corresponding information; (d) processing each of the ER models to produce corresponding information for the corresponding design model; (e) determining if there are any references between the ER models; and (f) if there are any references between the ER models, specifying corresponding references in corresponding design models; and wherein converting physical aspects comprises:(g) scanning through the relational catalogs; (h) for a first of the relational catalogs, creating a corresponding first DBMS catalog in the relational database; (i) for each of the relational schemas in the first relational catalog, creating a corresponding DBMS schema in the corresponding DBMS catalog to hold corresponding information; and (j) processing each of the relational schemas to produce corresponding information for the corresponding DBMS schema (For the remainder of steps b-j are steps found in the user manual of the ER2CWM tool.)(Page 461, paragraph 1).

It would have been obvious to a person of ordinary skill in the art at the time of Applicant's invention to modify the teachings of Teorey with the teachings of Farpinyo to include a method wherein converting logical aspects comprises the operations of: (a) scanning through the ER libraries; (b) for a first of the ER libraries, creating a corresponding first design library; (c) for each of the ER models in the first ER library, creating a corresponding design model in the corresponding first design library to hold corresponding information; (d) processing each of the ER models to produce corresponding information for the corresponding design model; (e) determining if there are any references between the ER models; and (f) if there are any references between

the ER models, specifying corresponding references in corresponding design models; and wherein converting physical aspects comprises:(g) scanning through the relational catalogs; (h) for a first of the relational catalogs, creating a corresponding first DBMS catalog in the relational database; (i) for each of the relational schemas in the first relational catalog, creating a corresponding DBMS schema in the corresponding DBMS catalog to hold corresponding information; and (j) processing each of the relational schemas to produce corresponding information for the corresponding DBMS schema with the motivation to facilitate database design, creation, and maintenance via a standard CWM format that can also be ported for use in other environments. (Farpinyo, Abstract).

**(10) Response to Argument**

(a) Applicant argues "Applicant has amended claim 15 to limit claim 15 and its dependent claims to machine-accessible storage medium in order to obtain a timely Allowance."

The Examiner acknowledged the storage medium in the Final Office Action, mailed 11 January 2007 by maintaining the 35 U.S.C. 101 rejection. In addition, the Examiner notes that the Applicant's specification should be objected to as failing to provide proper antecedent basis for the claimed subject matter, "a machine-accessible storage medium."

(b) Applicant argues "The Examiner did not respond to Applicant's arguments regarding the system claims 27-38."

The Examiner agrees with the Applicant that the Examiner erroneously referred to claim 27 as claim 21 in both office actions. Nonetheless, the Examiner had addressed the arguments in the Final Office action, mailed 11 January 2007.

(c) "Teorey does not disclose, either inherently or explicitly, at least one of the following elements: converting logical aspects of a common warehouse model (CWM) to corresponding design items for a relational database by processing in a hierarchical manner the logical aspects and creating the corresponding design items, the logical aspects comprising entity-relationship

(ER) libraries, the ER libraries comprising ER models, the corresponding design items comprising design libraries, the design libraries comprising design models."

The Examiner disagrees. Teorey teaches that "relational database design has been accomplished with a variety of approaches, including top-down, bottom-up, and combined methodologies." Clearly, the Common Warehouse Model is an example of these "variety of approaches" Teorey suggests. In addition, Common Warehouse Model (CWM) is an instance of a data warehouse model, that is defined in the Microsoft Computer Dictionary, 5th Ed., as 'A database, frequently very large, that can access all of a company's information. While the warehouse can be distributed over several computers and many contain several databases and information from numerous sources in a variety of formats, it should be accessible through a server. Thus, access to the warehouse is transparent to the user, who can use simple commands to retrieve and analyze all the information...' Furthermore, the Applicant states in the specification that CWM stems from UML, which is an instance of object-oriented programming. Object-oriented programming has existed from the 1970s. Given that the Examiner is allowed the broadest interpretation of the claims, the prior art of record clearly anticipates the recited claims. Therefore, Teorey teaches a method comprising: converting logical aspects (i.e. entities, attributes, and relationships)(page 200) of a common warehouse model (CWM) to corresponding design items (see section 1. ER Modeling and Extended Constructs)(pages 199-203) for a relational database (i.e. relational model)(page 198) by processing in a hierarchical manner (i.e. top-down,

bottom-up, etc.; see also subset hierarchies and generalization hierarchies associated with ER models)(Abstract; pages 200-201) the logical aspects and creating the corresponding design items, the logical aspects comprising entity-relationship (ER) libraries, the ER libraries comprising ER models (see Figure 13 and Table 1), the corresponding design items comprising design libraries, the design libraries comprising design models (i.e. *"A database design methodology is defined for the design of large relational databases. First, the data requirements are conceptualized using an extended entity-relationship model, with the extensions being additional semantics such as ternary relationships, optional relationships, and the generalization abstraction. The extended entity-relationship model is then decomposed according to a set of basic entity-relationship constructs, and these are transformed into candidate relations."*)(Abstract).

(d) "Farpinyo does not disclose either inherently or explicitly, any of the following elements: converting logical aspects of a common warehouse model (CWM) to corresponding design items for a relational database by processing in a hierarchical manner the logical aspects and creating the corresponding design items, the logical aspects comprising entity-relationship (ER) libraries, the ER libraries comprising ER models, the corresponding design items comprising design libraries, the design libraries comprising design models."

The Examiner disagrees. Farpinyo teaches a method comprising: converting logical aspects (i.e. ER diagram)(Abstract, page 456, paragraph 1) of a common warehouse model (CWM) (i.e. CWM)(Abstract, pages 456, paragraph 1) to corresponding design items (i.e. database schemas) (Abstract, page 456, paragraph 1) for

a relational database (i.e. relational database)(Abstract, page 456, paragraph 1) by processing in a hierarchical manner (i.e. mapping) (Abstract, page 456, paragraph 1) the logical aspects (i.e. ER diagram)(Abstract, page 456, paragraph 1) and creating the corresponding design items (i.e. creating CWM relational database schemas from physical data models represented by ER diagrams.)(Abstract), the logical aspects comprising entity-relationship (ER) libraries, the ER libraries comprising ER models (see Figures 2, 4a and 4b), the corresponding design items comprising design libraries, the design libraries (see Figures 2, 4a and 4b) comprising design models (i.e. *"This paper presents a design and development of a tool called ER2CWM that creates CWM relational database schemas from physical data models represented by ER diagrams. The tool supports the creation of ER diagrams, transformation into CWM format, and creation of database schemas for relational database management systems. It can also transform database schemas back into CWM and ER diagrams respectively." "ER diagrams are generally used to express designs of relational databases [1]. There are tools, such as PowerDesigner [2] and Erwim [3], that can help database designers to design a database with ER diagrams and create database schemas. These tools usually support the reverse of the process to create ER diagrams from existing database schemas also. All these are done via intermediate schema representations that are specific to individual design tools. This means, for example, PowerDesigner and Erwim both have their own metadata format that represents ER models and is used to create database schemas. This situation is not convenient for the designers to export a database schema designed and created by one tool to other working environments since specific mappng between the metadata of the source environment and the one understood by the target will be required for each pair of the exchanging environment."* Furthermore, in applications, such as the tool described in the prior art, libraries and model must exist for the application to function for it's intended use, which is to

create CWM relational database schemas from physical data models represented by ER diagrams.)(Abstract; page 456, paragraph 1).

(e) "Teorey and Farpinyo, taken alone or in any combination, do not disclose, suggest, or render obvious, at least one of the following elements: converting comprises the operations of: (a) scanning through the ER libraries; (b) for a first of the ER libraries, creating a corresponding first design library; (c) for each of the ER models in the first ER library, creating a corresponding design model in the corresponding first design library to hold corresponding information; (d) processing each of the ER models to produce corresponding information for the corresponding design model; (e) determining if there are any references between the ER models; and (f) if there are any references between the ER models, specifying corresponding references in corresponding design models."

The Examiner disagrees. Teorey discloses a logical design methodology for relational databases using the extended **entity-relationship model**. Farpinyo discloses designing and **creating relational schemas** with a CWM-Based Tool using a tool called **ER2CWM that creates CWM relational database schemas from physical data models represented by ER diagrams**. The use of ER diagrams are extensibly addressed in both prior arts of records, and because CWM is one of the variety of approaches as stated in Toerey, the motivation to combine would be to facilitate database design, creation, and maintenance via a standard CWM format that can also be ported for use in other environments. (Farpinyo, Abstract). Thus the combination of Teorey and Farpinyo teaches

converting comprises the operations of: (a) scanning through the ER libraries; (b) for a first of the ER libraries, creating a corresponding first design library; (c) for each of the ER models in the first ER library, creating a corresponding design model in the corresponding first design library to hold corresponding information; (d) processing each of the ER models to produce corresponding information for the corresponding design model; (e) determining if there are any references between the ER models; and (f) if there are any references between the ER models, specifying corresponding references in corresponding design models (please refer to the rejection addressed above.).

**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Farhan Syed

Conferees:

Jeffrey Gaffin (SPE, AU 2165) for

Eddie Lee (TQAS/Appeals Specialist TC 2100)

EDDIE C. LEE
SUPERVISORY PATENT EXAMINER